

IN THE NAME OF ALLAH



Phonetics & Phonology of English (Phon. & Phono.)

This course-material of Phonetics & Phonology of English
(Phon. & Phono.), includes further readings, research papers
and references related to the subject and available in
the library and your pen-drives.
(It is For Private Circulation Only)

3rd-Year-B.Ed.-English, 1st Semester 2014-2015,
Department of English,
Zabid-College of Education,
Hodeidah University

Wednesdays, 11:00 a.m. – 02:00 p.m., Hall – 9

Lecturer:
Dr. Abdullah Shaghi

In the Name of Allah



Phonetics & Phonology of English (Phon. & Phono.)

**A Course Handout
For 3rd-Year-English-B.Ed. Students, 1st semester 2014-2015,
Department of English, Zabid-College of Education, Hodeidah University
Lecturer: Dr. Abdullah Shaghi**

1. Introduction

The course **Phonetics & Phonology of English** aims at developing the Yemeni students' awareness of how Phonetics & Phonology of English in Yemen (especially in Tihamah of Yemen, Zabid city, Zabid College of Education, Hodeidah University) is structured and studied. The Yemeni students will study some important terms and facts about Phonetics in general and Phonology of English (and Arabic) in particular.

In your 1st and 2nd years, you studied **Spoken English 1, 2, 3, and 4** where you learnt some conversations with listening and speaking skills and with practice of English sounds, syllables and connected speech, stresses and intonations, respectively.

Last year, you studied the course '**Introduction to Language 1**', where you learnt some introductory aspects of the sounds of English as well as Arabic and their patterns (i.e. phonetics and phonology) as well as some differences between English and Arabic in Phonetics and Phonology.

This year, in your 1st semester 2014-2015, you're going to study and learn '**Phonetics and Phonology of English**' in more details. That is to say you're going to study and learn the speech organs, the structure of sounds/phonemes, the phonological processes, syllables, stress and intonation (in English in the first place and Arabic in the second place).

The study of the structure of words/morphemes, phrases, and sentences (in English in the first place and Arabic in the second place), by Allah willing/if Allah wills, will be studied in the course '**Morphology & Syntax**', in the 2nd semester 2014-2015.

1.1. Course Description

This course introduces students reading English as Foreign Language to production and description of English sounds and the phonological processes that these sounds go through in company of each other. The course involves **theoretical** and **practical** speech guidance and practice to help students learn and acquire a high degree of ability and knowledge in / of Speech Mechanism and correct pronunciation and (IPA) transcription of **English** sounds, syllables, stresses and intonation. For the sake of correlation or non-correlation, some similar or dissimilar ideas, where necessary / needed of Phonetics & Phonology of **Arabic** will also be taken into consideration in your study.

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5.1. Narrow vs. Broad Transcription

1.3. Key Linguistic Terms and Concepts

The Key Linguistic Terms and Concepts for the Phonetics and Phonology of (English) are as follows:

- **Phonetics:** articulatory phonetics, acoustic phonetics, consonants, vowels, glides, nasal sounds, oral sounds, voiced consonants, voiceless consonants, voiceless vowels, stops, fricatives, affricates, labial, bilabial, dental, alveolar, alveo-dental, palatal, uvular, glottal, ingressive, egressive, velar, velarized consonants, palatalized consonants, aspirated consonants, front vowels, back vowels, high vowels, low vowels, mid-vowels, semi-vowels, round vowels, syllabic consonant.
- **Phonology:** segmental phonology, supra-segmental phonology, phonemes, phones, allophones, phonological changes and rules, vowel coalescence, vowel addition, vowel deletion, default vowel, vowel shortening, vowel lengthening, epenthesis, umlaut, homorganic nasal, nasalization, consonant deletion, consonant addition, distribution, complementary distribution, free variation, assimilations, dissimilations, insertions, minimal pairs, syllable, open syllable, closed syllable, prosodic features, stress, tempo, intonation, rhythm .

1.4. Assessment

- Class Presentation/Continuous Assessment/mid-term exam: 45% of final mark.
- End of Semester Examination: 105% of final mark.

1.5. Who am I?

To learn more about me, search my name “shaghi, / abdullahshaghi / drabdullahshaghi / abdullah.shaghi / abulbaraa shaghi” on my website (where you can download all the lectures and models of final examinations): <http://abdullahshaghi2012.wordpress.com/> as well as on my gmail / google drive / google blogger, LinkedIn.com, academia.com, scribd.com, or archive.org.

2. Phonetics and Phonology

Phonetics and Phonology are the two primary linguistic disciplines concerned with speech sounds - those sounds that are used by humans to communicate. Phonetics and phonology both study language sound; both areas are mutually dependent. **Phonetics** describes the concrete, physical **form of sounds** (how they are produced, heard and how they can be described), while **phonology** is concerned with the **function of sounds**, that is with their status and inventory in any given language. In other words, phonetics studies the actual sounds that we produce while phonology studies the abstract patterns of the sounds in our mind.

To fulfill the aim of this course handout, which is to provide an outline of the sounds of various English sounds and how those sounds combine and pattern together, we will need aspects of both Phonetics and Phonology.

2.1. Phonetics

Phonetics is a scientific description of what speech sounds exist in a language. It represents how they are produced and perceived and what acoustic properties they have. Thus, it can be put in the class of natural sciences. Phonetics essentially seeks to trace the processes physiologically involved in sound production. It examines how symbolic sound is manifested as a continuous physical object. It describes the ways the sounds are produced and the points at which they are articulated.

Phonetics provides objective ways of describing and analyzing the range of sounds humans use in their languages. More specifically, **articulatory phonetics** identifies precisely which speech organs and muscles are involved in producing the different sounds of the world's languages.

Those sounds are then transmitted from the speaker to the hearer, and **acoustic and auditory phonetics** focus on the physics of speech as it travels through the air in the form of sound waves, and the effect those waves have on a hearer's ears and brain. It follows that phonetics has strong associations with anatomy, physiology, physics and neurology.

Phonetics is used by all sorts of people. It is used in at least two of the professions allied to medicine, speech therapy and audiology. In education, phonetics is not just a subject of study in its own right, but it is also an important tool in language teaching and learning (English as well as any other modern languages), drama studies, singing and so on; it even features in many

UK secondary school English Language syllabuses. Phonetics interfaces with the law both in forensic phonetics and in other less obvious areas like issues over product names and trademarks. Phonetics is important in the theatre and the media (accent coaching and voice production, for example, rely on phonetic knowledge). Publishers rely on phonetics for dictionaries, foreign language courses and travelers' phrase books. Knowledge of phonetics is also immensely important in the technological revolution, both in voice activated systems (security devices, telephone banking systems, etc.) and also devices that 'speak' (from toys to talking computers). I could go on but this is perhaps enough to give you some idea of what phoneticians can do beyond the teaching of phonetics as an academic subject. Let's have a closer look at one or two of these applications.

All above from: (Ashby, Patricia, (2005) (2nd edition). *Speech Sounds*, Rotledge Taylor & Francis Group. London and New York)

2.1.1. Phones and Phonetics

The two basic tasks of phonetics are the **transcription** and the **classification** of sounds, also called **phones** in this context. The **phone** is therefore the basic unit of phonetics and it refers to the concrete sound substance as such.

In the area of **articulatory phonetics** this substance is described on the basis of the **articulatory properties**. These refer to the human **vocal tract** (or to the speech organs), illustrated below, and are used to describe and classify sounds.

By contrast, **acoustic** and **auditory phonetics** deals with the characteristics of sound waves and how they are perceived by the human ear.

Phones are represented by placing brackets around the transcription ([da:ns] / [dæns] for *dance* in British and American English)).

The usefulness of a **transcription** system (a phonetic alphabet) is particularly reasonable in a language such as English, where pronunciation and spelling often diverge substantially (cp. *see* – *sea* on the one hand, and *through* and *though*, on the other).

There are various transcription models, such as the **IPA (the International Phonetic Alphabet)** where sounds are encoded by this phonetic alphabet; for the transcription of English, several, slightly differing systems have evolved, all of them following in some way the original model of the phonetician **Daniel Jones**.

2.1.2. The International Phonetic Alphabet (IPA)

Briefly speaking, the **International Phonetic Alphabet (IPA)** is one of the most popular and well-known phonetic alphabets. It was originally created by primarily British language teachers, with later efforts from European **phoneticians** and **linguists**. It has changed from its earlier intention as a tool of foreign language pedagogy to a practical alphabet of linguists. It is currently becoming the most often seen alphabet in the field of phonetics.

The IPA chart contains all the basic tools needed to transcribe speech sounds: consonant symbols for primary or basic articulations in the main grid, additional symbols (which do not fit the grid, like double articulations), diacritics to modify all the basic symbols (vowels and consonants), vowel symbols, and symbols for tone and intonation.

(Summary from: (Ashby, Patricia, (2005) (2nd edition). *Speech Sounds*,
Routledge Taylor & Francis Group. London and New York))

See in the next page the chart of the International Phonetic Alphabet (revised to 2005) reproduced from the following site:

http://en.wikipedia.org/wiki/Phonetic_transcription accessed on 23/09/2014

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)

© 2005 IPA

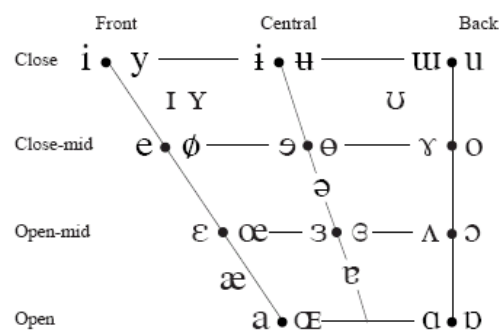
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			r					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
ʘ Bilabial	ɓ Bilabial	ʼ Examples:
ǀ Dental	ɗ Dental/alveolar	pʼ Bilabial
ǃ (Post)alveolar	ɟ Palatal	tʼ Dental/alveolar
ǂ Palatoalveolar	ɡ Velar	kʼ Velar
ǁ Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative

VOWELS



p - pip, pot b - bat, bug t - tell, table d - dog, dig k - cat, key g - get, gum f - fish, phone v - van, vat θ - thick, thump, faith ð - these, there, smooth s - sat, sit z - zebra, zap	ʃ - ship ʒ - treasure, leisure h . hop, hut tʃ - chip dʒ - lodge, judge m . man, mummy n . man, pan ŋ . sing, wrong l . let, lips r . rub, ran w . wait, worm j . yet, yacht	ɪ - bit, silly e - bet, head æ . cat, dad ɒ - dog, rotten ʌ - cut, nut ʊ - put, soot ə - about, clever	i: - cream, seen ɜ: - burn, firm ɑ: - hard, far ɔ: - corn, faun u: - boob, glue	aɪ - spice, pie eɪ - wait, fate ɔɪ - toy, joy əʊ - oats, note aʊ - clown, vow ɪə - deer, pier eə - hair, bear ʊə - cure,
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2.2. Phonology

Phonology is concerned with the regularities that govern the phonetic realizations of sounds in words of a language. It examines language sound as a mental unit, encapsulated symbolically for example as [g] or [o], and focuses on how these units function in grammars. It looks at and tries to establish a system of sound distinctions relevant to a particular language. It then seeks to determine how the elements of this abstract system behave in actual speech. Phonology actually delineates the function of sounds in particular contexts.

3. Phonetics and Phonology of English

Phonetics and Phonology of English is our concern. It is the English Linguistic course concerned with English speech sounds - those sounds that are used by English humans to communicate. **Phonetics of English** describes the concrete, physical **form of English sounds** (how they are produced, heard and how they can be described), while **phonology of English** is concerned with the **function of English sounds**, that is with their status and description in English language. In other words, Phonetics of English studies the actual English sounds that we produce while phonology of English studies the abstract patterns of the English sounds in our mind.

Phonetics is concerned with how sounds are produced; how they are transmitted; and how they are perceived (here, we will only look at the production of sounds). Phonology is concerned with how sounds function in relation to each other in a language. In other words, phonetics is about sounds of language in general and English language in particular. Phonology is about the sound systems of (English) language. Phonetics is a descriptive tool necessary to the study of the phonological aspects of (English) language.

Phonetics and phonology of English are worth studying for several reasons. One is that as all study of language, the study of phonology gives us insight into how the human mind works. Two more reasons are that the study of the phonetics of a foreign language gives us a much better ability both to hear and to correct mistakes that we make, and also to teach pronunciation of the foreign language (in this case English) to others.

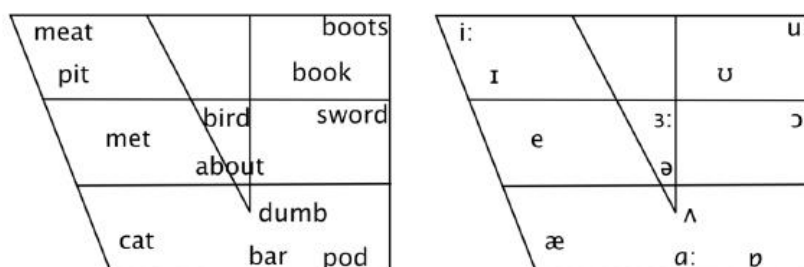
As phonetics and phonology of English both deal with English sounds, and as English spelling and English pronunciation are two very different things, it is important that you keep in mind that we are not interested in letters here, but in sounds. For instance, English has not 5 or 6 but 20 different vowels, even if these vowels are all written by different combinations of 6 different letters, "a, e, i, o, u, y". The orthographic spelling of a word will be given in italics, e.g. *please*, and the phonetic transcription between square brackets [pli:z]. Thus the word *please* consists of three consonants, [p,l,z], and one vowel, [i:]. And sounds considered from the phonological point of view are put between slashes. We will use the symbols in figure (1).

3.1. Phonetics of English

Phonetics is the study of human sounds in general without reference to their systemic role in a specific language. **Phonetics of English** (or any other language) is divided into three types according to the production (**articulatory phonetics**), transmission (**acoustic phonetics**) and perception (**auditory phonetics**) of sounds.

Our concern for the phonetics of English is the articulatory phonetics where you study the **speech mechanism** (i.e. the vocal tract and speech organs/articulators, air stream mechanism, speech chain and states of the glottis) as well as the English sounds that can be divided into consonants and vowels. The consonants can be described by **voicing** (causing the vocal folds/cords to vibrate: voiced or voiceless), **place of articulation** (where the articulation happens) and **manner of articulation** (how the articulation happens).

For vowels one uses a coordinate system called a **quadrangle** (see it below) within which actual vowel values are located.



Quadrangle for the English Vowels with Examples

3.1.1. Speech Mechanism

3.1.1.1. The Vocal Tract and Speech Organs and Articulators

As shown in the following diagram/figure 1, the **vocal tract** is the part of our body through which air passes during speech. The vocal tract runs from the **lungs** up through the **trachea** (or windpipe), through the **pharynx** (the space at the back of the mouth), and there it divides into the **oral cavity / tract** (the space inside the mouth) and the **nasal cavity / tract**; it reaches the outside world at the **lips** and at the **nostrils**. The parts of vocal tract that can be used to form sounds are called **speech organs/articulators**.

Articulators can be subdivided into **active** (those that move e.g. tongue) and **passive** (those that are fixed, e.g. hard palate). Most sounds are produced with at least one active and passive articulator. When an articulator interacts with another, it's said to articulate with it. For instance, in the production of the sound /b/, the lower lip articulates with the upper lip.

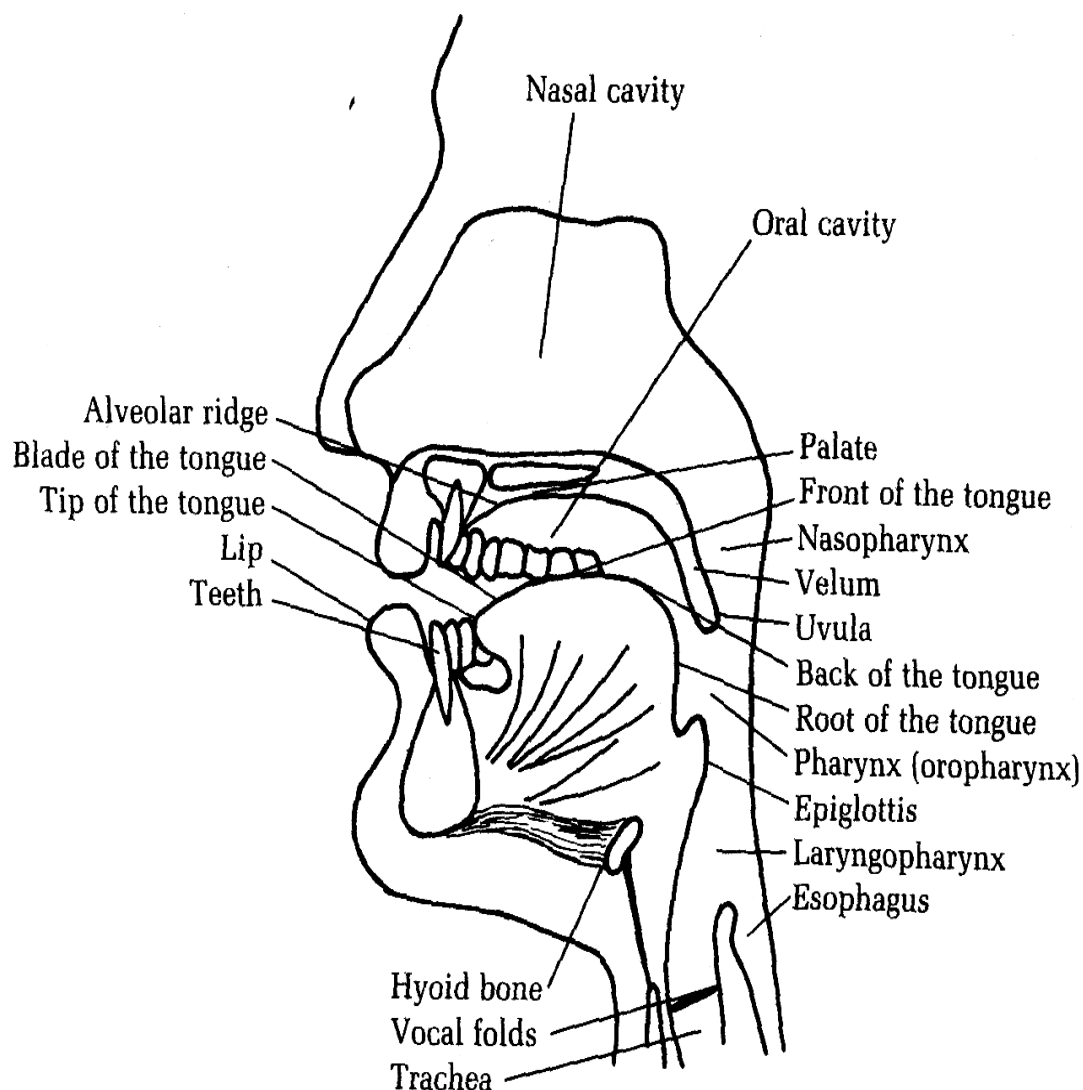


Figure 1: The Vocal Tract and Speech Organs and Articulators

The production of speech involves the skillful manipulation of all the Speech Organs and Articulators in the Vocal Tract and these are explained in details below:

The Trachea

The trachea is the tube going to the lungs. In other words, it is a 'pipe' that connects the lungs and the larynx.

The Larynx or Adam's Apple

The larynx which is a part of the human anatomy on top of the **trachea** is containing the vocal cords / folds. The larynx is most noticeable in the adult

male neck, where it 'sticks out' as what is known as the **Adam's apple**. The speech-functions of the larynx are taken on by the vocal cords / folds, which are inside of the larynx. These functions include the production of the voicing of sounds, and the production of [h] and of the glottal stop /ʔ/.

The Pharynx

The pharynx is the back wall of the throat behind the tongue. The shape, length, and volume of the entire chamber can be modified by the constrictive action of the muscles enclosing the pharynx, the movement of the back of the tongue, and by the position of the velum, which, when raised, excludes the nasopharynx. As a result, it is in the pharynx that the voice pattern (distinctive voice quality) of an individual person is formed.

The Uvula

The uvula is a small fleshy flap of tissue that hangs in the back of the mouth and is the extension of the velum or the soft palate. Sounds articulated with the back of the tongue and uvula are called **uvular**. An example of a uvular sound is the first consonant in the French word rouge (/ru:ʒ/). Velar and uvular sounds used to be known collectively as guttural (< Lat. guttur, 'gullet').

The Velum or Soft Palate

The velum or soft palate is the soft tissue immediately behind the tongue. Its main function is to separate the nasal cavity from the oral cavity. When it is raised, it forces all air through the mouth; lowered, it allows air through the nose. Sounds like /g/ or /k/, whereby the back of the tongue is in contact with the lower side of the velum are called velar consonants.

The Hard Palate

The hard palate, which is often simply called the palate, or the roof of the mouth, is the bony structure that lies just behind the alveolar ridge. When the forward part of the tongue touches the hard palate, the resultant sound is said to be palatal: e.g. the initial consonant in the English word yellow (/ˈjeləʊ/).

The Alveolar Ridge

The alveolar ridge (teeth-ridge) is the bony ridge behind the upper teeth. Sounds produced with the tongue touching this part are said to be alveolar: e.g. the initial and final consonants in the English word sit (/sɪt/).

The Tongue

The tongue is the most movable articulator (with the tip, for instance, being able of movements of up to 9 times per second) and can take up an almost limitless number of positions, both vertically and horizontally. The tongue is the principal agent in the formation of vowel sounds. The various parts of the tongue are (from back to front): **root** – **back** (the part facing the soft palate) – **front** (opposite the hard palate) – **blade** (the part facing the teeth-ridge) – **tip** (apex). The edges of the tongue are called the rims. In the production of vowels, the tongue tip usually remains low behind the lower teeth. Sounds produced with the tongue tip are apical; those made with the blade (< Lat. lamen) are laminal, and those made with the back (Lat. dorsum) of the tongue are dorsal. Sounds articulated with the tip or blade of the tongue raised towards the teeth, alveolum, or hard palate are said to be coronal (e.g. English /t/).

The Teeth

The teeth, mainly the various upper teeth are very important for the production of many consonants, like the initial sounds in the English words *this* (/ðɪs/) and *thing* (/θɪŋ/).

The Lips

The lips assist in the formation of both vowels and consonants. For vowels, for instance, it is important to know whether they are rounded (e.g. /u:/ in *doom*) or spread (e.g. /i:/ in *heed*). They can also be pressed together they produced bilabial sounds (e.g. /p/, /b/), or the lower lip can articulate with the upper teeth, resulting in labiodental sounds (e.g. /f/, /v/). Only the lower teeth and lip can move since they are attached to the lower jaw.

The Nose or Nasal Cavity/Tract

The nose, or nasal cavity, is divided into two cavities – i.e. the nostrils - by a central bone, known as the septum. The roof of the nasal cavity is very narrow, whereas the floor is smooth and relatively wide. The side walls are extremely irregular. At the back, the nasal cavity leads into the nasopharynx (see above), which, as we have seen, can be shut off from the oropharynx by means of the velum.

The Mouth or Oral Cavity/Tract

The shape of the mouth usually finally determines the quality of our speech sounds despite the fact that all the other speech organs previously mentioned

play important roles in speech production. Far more finely controlled variations of shape and realizations are possible in the mouth than in any other part of the speech mechanism. The only points which may be regarded as being relatively fixed in the mouth are the **upper teeth**, the **alveolar ridge**, the **hard palate** and the **pharyngeal wall**.

3.1.1.2. The Air Stream Mechanism

The most usual source of energy for speech production is the air stream expelled from the lungs. This is called the **Pulmonic Egressive Air Stream**. The term, pulmonic, has to do with the lungs. Egressive has to do with the fact that it is coming out. The opposite of this is **ingressive**, that is, being sucked in. Air stream may be regarded as a continuum of release of air. It is called **mechanism** because it is a process of air stream release that works together to form sounds. The English language normally makes use of the pulmonic egressive air stream mechanism for the production of its sounds. The diagram of the pulmonic air stream movement is shown in figure 2 below. The diagram shows the air stream directionally moving upwards out of the lungs. Fig. 2 graphically shows the air direction out of the lungs. The arrows reveal the direction of the air stream as it comes outwards from the lungs towards the larynx.

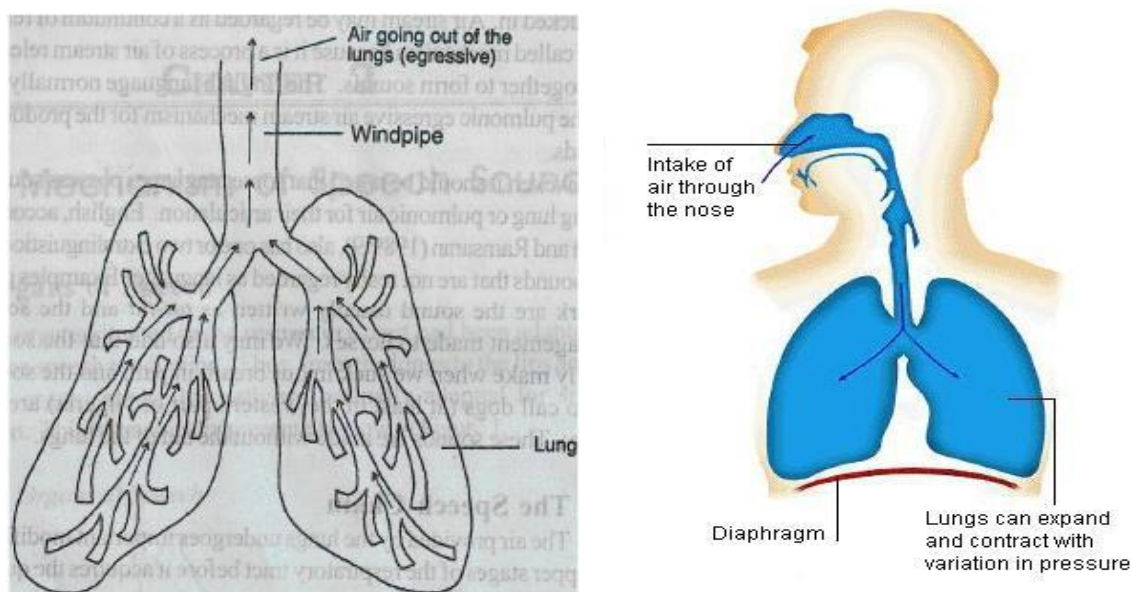


Figure 2. The Pulmonic Egressive Air Stream Mechanism

3.1.1.3. The Speech Chain

The different stages involved in the process of speech production from the initiation to that of its full realization is referred to as **speech chain**. As

mentioned above, English sounds generally make use of the air initiated from the lungs.

The air stream coming from the lungs first of all comes up through the **trachea**. It then passes through the **larynx or Adam's apple**. Within this structure, from rear to front, the vocal folds / cords are situated.

The two folds / cords are made up of ligament and elastic tissue. The folds / cords may be brought together or parted by rotation of the arytenoids cartilages, which are attached at the posterior end of the folds / cords, through muscular action. The opening (**the glottis**) between the folds / cords has the biological / natural function of helping to prevent foreign bodies from entering into the trachea and the lungs.

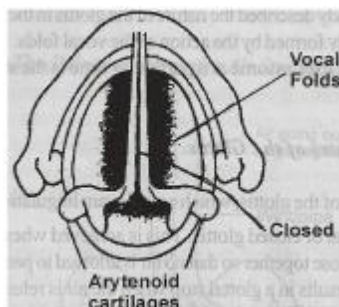
3.1.1.4. States of the Glottis

This is usually formed by the action of the vocal folds / cords. Whatever shape the vocal folds / cords may assume at a particular time is **the state of the glottis**. There are three states of the glottis, which are relevant linguistically:

1. The first is that of closed glottis. This is achieved when the folds are brought close together so that no air is allowed to pass between them. This results in a glottal stop when the air is released. This stop /ʔ/ frequently precedes the forceful articulation of vowels, e.g. [ʔaut, ʔi:t] *out, eat*. It may even replace the English stop /t/ in words like *football, bottle, bit*, etc. It may also reinforce or replace such other plosives like /p, k/.
2. The glottis may be held open for normal breathing. It is also this state that produces the voiceless sounds of English. Examples of these are /t, p, k, f, s, ʃ, tʃ, h/. The vocal folds are spread and do not vibrate. The glottis is sufficiently wide open to allow the air stream to pass through without obstruction or vibration of the vocal folds.
3. The third state of the glottis is that of the narrow glottis or vocal folds loosely held together. In this state, the vocal folds vibrate to produce voice, otherwise called phonation. This vibration of the larynx may be felt by laying a finger on or just above the Adam's apple. This bony structure houses the larynx. All vowels, nasals, glides and laterals are voiced. You can compare the dual phonemes /f-v, p-b, t-d, k-g, s-z, ʃ-ʒ, tʃ-dʒ/ to differentiate their phonation status, whether voiceless or voiced. This is the only thing differentiating these pairs of sounds that would have been otherwise similar. The first of the pairs are voiceless sounds while the second segments of the pairs have voiced sounds.

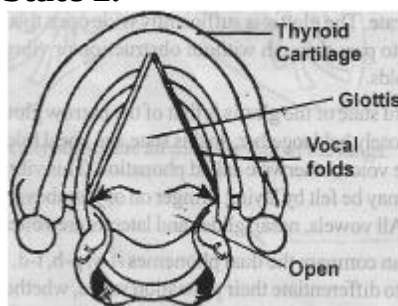
Figure 3. The Three States of the Glottis

State 1.



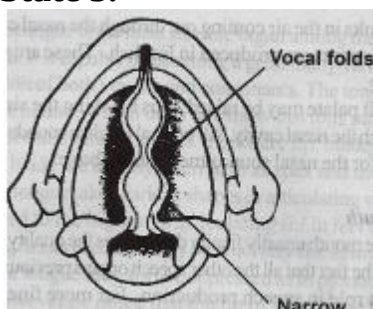
Vocal folds tightly held together as for the glottal stop /ʔ/.

State 2.



Vocal folds held open as for normal breathing and voiceless sounds.

State 3.



The vocal folds/cords are loosely held together to form a narrow glottis, which causes vibration as the air passes through. This results in the production of voiced sounds. (Adapted from Cruttenden, 1994)

→ These are the graphic representations of the three states of the glottis.

NB: All above from: (Daniel, Iyabode Omolara (2011). *Introductory Phonetics and Phonology of English*, Cambridge Scholars Publishing 12 Back Chapman Street, Newcastle upon Tyne, NE6 2XX, UK, ISBN (10): 1-4438-2638-3, ISBN (13): 978-1-4438-2638-9)

All above from:

(<http://home.cc.umanitoba.ca/~krussll/phonetics/articulation/describing-consonants.html> accessed on 11/11/2012 11:48 pm)

3.1.2. English Sounds

3.1.2.1. Description of English Vowels

English vowels can be described as **monophthongs** that were constant, i.e. vowels that were pronounced at one and the same place and English has 12 of them and **diphthongs**, which are vowels that change character during their pronunciation, that is, they begin at one place and move towards another place and English has 8 of them.

3.1.2.1.1. English Vowels/Monophthongs

English vowels/monophthongs are described according to where (in the mouth) they are produced. This method allows us to describe them as whether they are **short** or **long**, whether they are **front**, **central** and **back**. We can qualify them further by how **high** the tongue and **lower** jaw are when we make these vowel sounds, and finally by whether our **lips** are **rounded** or **spread/unrounded**. This scheme shows the following arrangement:

3.1.2.1.1.1. Short/Long Vowels

English has twelve pure vowel sounds. In the table above they are divided into seven short and five long vowels.

3.1.2.1.1.2. Front Vowels

- /i:/ - **cream**, **seen** (long high front spread vowel)
- /ɪ / - **bit**, **silly** (short high front spread vowel)
- /ɛ/ - **bet**, **head** (short mid front spread vowel); this may also be shown by the symbol /e/
- /æ/ . **cat**, **dad** (short low front spread vowel); this may also be shown by /a/

3.1.2.1.1.3. Central Vowels

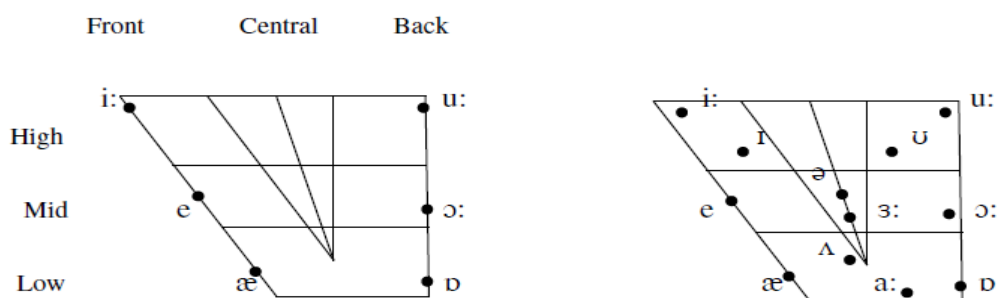
- /ɜ:/- **burn**, **firm** (long mid central spread vowel); this may also be shown by the symbol /ə:/
- /ə/ - **about**, **clever** (short mid central spread vowel); this is sometimes known as schwa, or the neutral vowel sound – it never occurs in a stressed position.

- /ʌ/ - **cut, nut** (short low front spread vowel); this vowel is quite uncommon among speakers in the Midlands and further north in Britain.

3.1.2.1.1.4. Back Vowels

- /u:/ - **boob, glue** (long high back rounded vowel)
- /ʊ/ - **put, soot** (short high back rounded vowel); also shown by /u/
- /ɔ:/ - **corn, faun** (long mid back rounded vowel) also shown by /o:/
- /ɒ/ - **dog, rotten** (short low back rounded vowel) also shown by /o/
- /ɑ:/ - **hard, far** (long low back spread vowel)

For more clarification, the following is the chart for conventionalized vowels (to the left) and English vowels (to the right):



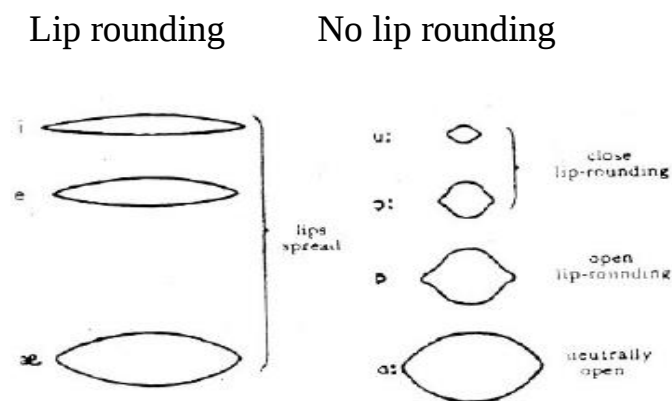
3.1.2.1.1.5. High/Mid/Low Vowels

We also distinguish three major degrees of **height**: high, mid, and low.

Imposing these categories on the above diagrams gives us the conventionalized vowels (to the left) and English vowels (to the right):

3.1.2.1.1.6. Rounded/Unrounded Vowels

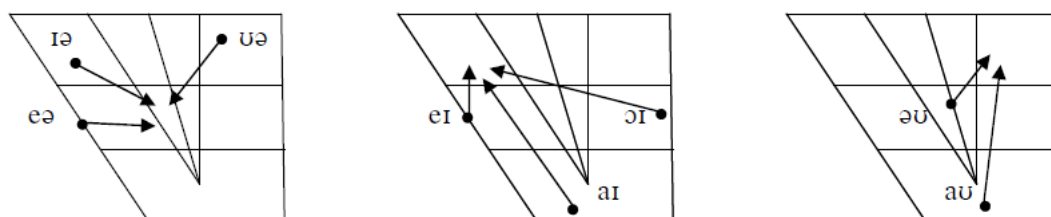
Vowels may also be different from each other with respect to rounding. If you compare [i:] in [tʃ i:z] *cheese* with [u:] in [tʃ u:z] *choose*, you will see that not only is [i:] a front vowel and [u:] a back vowel, but [i:] is also unrounded where [u:] is rounded. When pronouncing [u:] your lips are rounded, but when pronouncing [i:] the corners of the mouth are much further apart. See the following diagram:



Rounding: Adapted from (McCarthy 1967, p. 31)

3.1.2.1.2. Diphthongs

So far we have only been considering vowels that were constant, i.e. vowels that were pronounced at one and the same place. Such vowels are called **monophthongs**, and English has 12 of them. English also has 8 **diphthongs**, which are vowels that change character during their pronunciation, that is, they begin at one place and move towards another place. Compare for example the monophthong in *car* with the diphthong in *cow*, or the monophthong in *girl* with the diphthong in *goal*. The vowels of *cow* and *goal* both begin at a given place and glide towards another one. In *goal* the vowel begins as if it was [ə], but then it moves towards [ʊ]. Therefore it is written [əʊ], as in [gəʊl] *goal*, with two symbols, one for how it starts and one for how it ends. The diagrams below show the three types/groups of English diphthongs:



The easiest way to remember them is in term of three types/groups shown below in a table designed by the author of this handout:

Diphthongs							
Moving Towards Central				Moving Towards High			
Ending in / ə /				Ending in / ɪ /		Ending in / ʊ /	
/ ɔə /	/ ɪə /	/ eə /		/ aɪ /	/ eɪ /	/ ɔɪ /	/ əʊ /
							/ aʊ /

3.1.2.2. Summary of English Vowels Using Three-Term-Label

We can summarize the description of English vowels using three-term-label (front/central/back, high/mid/low and rounded/unrounded) in the following table designed by the author of this handout:

Description of English Vowels Using Three Term Label	
Short and long Vowels/Monophthongs	
i:	long high front unrounded monophthong
ɪ	short high front unrounded monophthong
e	short mid front unrounded monophthong
æ	short low front unrounded monophthong
ʊ	short low central unrounded monophthong
ɔ:	long low back unrounded monophthong
ʌ	short low back rounded monophthong
ɑ:	long mid back rounded monophthong
ʊ	short high back rounded monophthong
u:	long high back rounded monophthong
ɜ:	long mid central unrounded monophthong
ə	short mid central unrounded monophthong
Diphthongs	
aɪ	diphthong moving from mid front unrounded to high front unrounded
eɪ	diphthong low central unrounded to high front unrounded
ɔɪ	diphthong low back rounded to high front unrounded
əʊ	diphthong mid central unrounded to high back rounded
aʊ	diphthong low central unrounded to high back rounded
ɪə	diphthong high front unrounded to mid central unrounded
eə	diphthong mid front unrounded to mid central unrounded
ʊə	diphthong high back unrounded to mid central unrounded

3.1.2.3. Description of English Consonants

Producing a consonant involves making the **vocal tract** narrower at some location than it usually is. We call this narrowing a **constriction**. Which consonant you're pronouncing depends on where in the vocal tract the constriction is and how narrow it is. It also depends on a few other things, such as whether the vocal folds/cords are vibrating and whether air is flowing through the nose. In other words, we do this with the articulators – from the

glottis, past the velum, the hard palate and alveolar ridge and the tongue, to the teeth and lips. The sound results from three things/parameters/dimensions:

- **Voicing** – causing the vocal cords to vibrate
- **Place of Articulation** - where the articulation happens
- **Manner of Articulation** - how the articulation happens – how the airflow is controlled

For example, for the sound [d]:

- Voicing = voiced. (The vocal folds/cords are vibrating.)
- Place of articulation = alveolar. (The narrowing of the vocal tract involves the tongue tip and the alveolar ridge.)
- Manner of articulation = oral stop. (The narrowing is complete -- the tongue is completely blocking off airflow through the mouth. There is also no airflow through the nose.)

Now, the discussion of these three parameters/dimensions is given in details in the following subsections:

3.1.2.3.1. Voicing

All vowels must be voiced – they are caused by vibration in the vocal cords. But consonants may be voiced or not. Some of the consonant sounds of English come in pairs that differ in being voiced or not – in which case they are described as voiceless or unvoiced. So b is voiced and p is the unvoiced consonant in one pair, while voiced g and voiceless k form another pair.

The vocal folds/cords/cords may be held against each other at just the right tension so that the air flowing past them from the lungs will cause them to vibrate against each other. We call this process **voicing**. Sounds which are made with vocal folds/cords/cords vibration are said to be **voiced**. Sounds made without vocal folds/cords/cords vibration are said to be **voiceless**.

There are several pairs of sounds in English which differ only in voicing -- that is, the two sounds have identical places and manners of articulation, but one has vocal fold vibration and the other doesn't. The [θ] of *thigh* and the [ð] of *thy* are one such pair. The others are:

Voiceless	Voiced
[p]	[b]
[t]	[d]
[k]	[g]

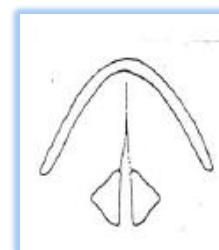
[f]	[v]
[θ]	[ð]
[s]	[z]
[ʃ]	[ʒ]
[tʃ]	[dʒ]

The other sounds of English do not come in voiced/voiceless pairs. [h] is voiceless, and has no voiced counterpart. The other English consonants are all voiced: [ɹ], [l], [w], [j], [m], [n], and [ŋ]. This does not mean that it is physically impossible to say a sound that is exactly like, for example, an [n] except without vocal fold vibration. It is simply that English has chosen not to use such sounds in its set of distinctive sounds. (It is possible even in English for one of these sounds to become voiceless under the influence of its neighbors, but this will never change the meaning of the word.)

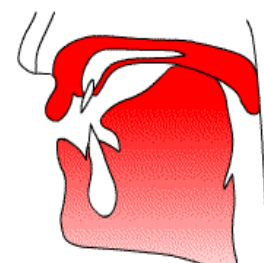
3.1.2.3.2. Place of Articulation

The place of articulation (or POA) of a consonant specifies where in the vocal tract the narrowing occurs. From front to back, the POAs that English uses are:

1. **Glottal Articulation** – articulation by the glottis. We use this for one consonant in English. This is /h/ in initial position in house or hope. The diagram to the right shows glottal sounds that are produced when the air passes through the glottis as it is narrowed: [h] as in *high*. (Adapted from: Roach 1983, p. 25)

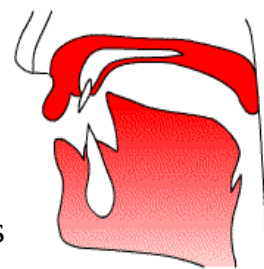


2. **Velar Articulation** – we do this with the back of the tongue against the velum. We use it for voiceless /k/ (as in cup), and initial hard /g/ (as in golf) and for final /ŋ/ (as in gong). The diagram to the right shows a typical [k] or [g] -- though where exactly on the velum the tongue body hits will vary a lot depending on the surrounding vowels.

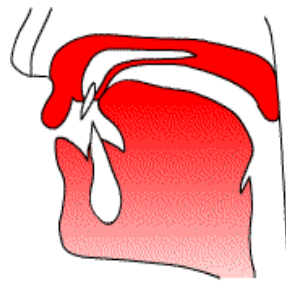


3. **Palatal Articulation** – we do this with the front of the tongue on the hard palate. We use it for /dʒ/ (as in jam) and for /ʃ/ (as in sheep or sugar).

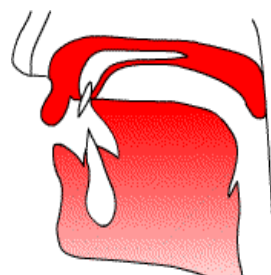
4. **Retroflex Articulation**- In a retroflex consonant, the tongue tip is curled backward in the mouth. English [ɭ] is a retroflex approximant -- the tongue tip is curled up toward the postalveolar region (the area immediately behind the alveolar ridge). The diagram to the right shows a typical English retroflex [ɭ].



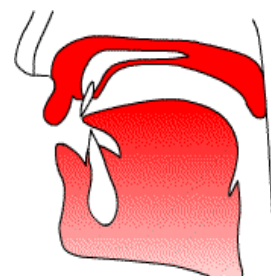
5. **Postalveolar Articulation**-In a postalveolar consonant, the constriction is made immediately behind the alveolar ridge. The constriction can be made with either the tip or the blade of the tongue. The English fricatives [ʃ] and [ʒ] are made at this POA, as are the corresponding affricates [tʃ] and [dʒ]. The diagram to the right shows the state of the vocal tract during the first half (the stop half) of an affricate [tʃ] or [dʒ].



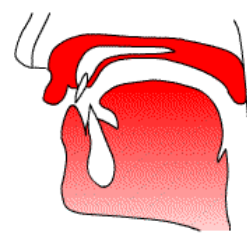
6. **Alveolar Articulation** – we do this with the tongue blade on the alveolar ridge. We use it for /t/ (as in teeth), /d/ (as in dog) /z/ (as in zebra) /n/ (as in no) and /l/ (as in light). The diagram to the right shows the state of the vocal tract during plosive [t] or [d].



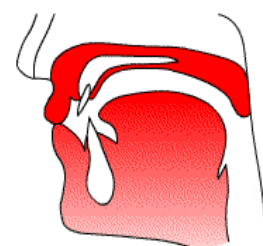
7. **Dental Articulation** – we do this with the tip of the tongue on the back of the upper front teeth. We use it for /θ/ (as in think) and /ð/ (as in that). This is one form of articulation that we can observe and feel ourselves doing. The diagram to the right shows a typical dental / inter-dental [θ] or [ð].



8. **Labio-dental Articulation** –In a labiodental consonant, the lower lip approaches or touches the upper teeth. English [f] and [v] are bilabial fricatives. The diagram to the right shows the state of the vocal tract during a typical [f] or [v].



9. **Labial Articulation** – we do this with the lips for /b/ (as in boat) and /m/ (as in most). Where we use two lips (as in



English) this is bilabial articulation. In a bilabial consonant, the lower and upper lips approach or touch each other. English [p], [b], and [m] are bilabial stops. The diagram to the right shows the state of the vocal tract during a typical [p] or [b]. (An [m] would look the same, but with the velum lowered to let out through the nasal passages.) The sound [w] involves two constrictions of the vocal tract made simultaneously. One of them is lip rounding, which you can think of as a bilabial approximant.

3.1.2.3.3. Manner of Articulation

This scheme gives us a different arrangement into stop (or plosive) consonants, affricates, fricatives, nasals consonants, laterals and approximants.

1. **Stop/Plosive consonants** (because the airflow is stopped) or plosive consonants (because it is subsequently released, causing an out-rush of air and a burst of sound) are:
 - Bilabial voiced /b/ (as in boat) and voiceless /p/ (as in post)
 - Alveolar voiced /d/ (as in dad) and voiceless /t/ (as in tap)
 - Velar voiced /g/ (as in golf) and voiceless /k/ as in (cow)
2. **Affricate consonants** are a kind of stop consonant, where the expelled air causes friction rather than explosion/outburst. They are palatal /tʃ/ (as in cheat) and palatal /dʒ/ (as in jam)
3. **Fricative consonants** come from restricting, but not completely stopping, the airflow. The air passes through a narrow space and the sound arises from the friction this produces. They come in voiced and unvoiced pairs:
 - Labio-dental voiced /v/ (as in vole) and unvoiced /f/ (as in foal)
 - Dental voiced /ð/ (as in those) and unvoiced /θ/ (as in thick)
 - Alveolar voiced /z/ (as in zest) and unvoiced /s/ (as in sent)
 - Palatal voiced /ʒ/ (as in the middle of leisure) and unvoiced /ʃ/ (as at the end of trash)
4. **Nasal consonants** involve closing the articulators but lowering the uvula, which normally closes off the route to the nose, through which the air escapes. There are three nasal consonants in English:
 - Bilabial /m/ (as in mine)
 - Alveolar /n/ (as in nine)
 - Velar /ŋ/ (as at the end of gong).

5. **Lateral consonants** allow the air to escape at the sides of the tongue. In English there is only one such sound, which is alveolar /l/ (as at the start of lamp)
6. **Approximant consonants** do not impede the flow of air. They are all voiced but are counted as consonants chiefly because of how they function in syllables. They are:
 - Bilabial /w/ (as in water)
 - Alveolar /r/ (as in road)
 - Palatal /j/ (as in yet)

The manners of articulation can be put into two major groups: **Obstruents** and **Sonorants**. The obstruents are plosives, fricatives and affricates, all sounds with a high degree of obstruction. Obstruents usually come in pairs, one voiceless, one voiced, e.g. [p/b, t/d]. The sonorants have much less obstruction and are all voiced and therefore more sonorous. They include nasals, the lateral, and approximants. The manners can be illustrated as in the following table designed by the author of this handout:

Consonants					
Obstruents			Sonorants		
Plosives	Fricatives	Affricates	Nasals	Laterals	Approximants

3.1.2.4. English Consonant Chart

It is often useful to display the consonants of a language in the form of a chart. There is a conventional way of doing so:

- Columns show places of articulation, arranged (roughly) from the front of the vocal tract to the back.
- Rows show manners of articulation.
- Within each cell, the symbol for a voiceless sound is shown toward the left of the cell and the symbol for a voiced sound toward the right.

3.1.2.5. Chart of English Consonants

The following is the chart for English consonants in which the abovementioned description of English consonants can be summarized showing (Voicing, Place of Articulation, and Manner of Articulation (VPM) :

	Bilabial		labiodental	dental	alveolar		postalveolar	retroflex	palatal	velar	Glottal
Plosive	P	b			t	d				k	g
Nasal		m				N				ŋ	
Fricative		f	V	θ	ð	s	z	ʃ	ʒ		h
approximant		(w)						ɹ	j	(w)	
lateral approximant						l					
Affricate							tʃ	dʒ			

<http://home.cc.umanitoba.ca/~krussll/phonetics/articulation/describing-vowels.html> accessed on 02/10/2014 11:52 pm

3.1.2.6. Summary of English Consonants Using Three-Term-Label

Based on the above chart, we can also summarize the description of English consonants using a Three-Term-Label (Voicing, Place of Articulation, and Manner of Articulation (VPM) in the following table designed by the author of this handout:

[p]	voiceless Bilabial	Plosive
[b]	voiced Bilabial	Plosive
[t]	voiceless Alveolar	Plosive
[d]	voiced Alveolar	Plosive
[k]	voiceless Velar	Plosive
[g]	voiced Velar	Plosive
[tʃ]	voiceless Postalveolar	Affricate
[dʒ]	voiced Postalveolar	Affricate
[m]	voiced Bilabial	Nasal
[n]	voiced Alveolar	Nasal
[ŋ]	voiced Velar	Nasal
[f]	voiceless Labiodentals	Fricative

[v]	voiced	Labiodentals	Fricative
[θ]	voiceless	Dental	Fricative
[ð]	voiced	Dental	Fricative
[s]	voiceless	Alveolar	Fricative
[z]	voiced	Alveolar	Fricative
[ʃ]	voiceless	Postalveolar	Fricative
[ʒ]	voiced	Postalveolar	Fricative
[ɹ]	voiced	Retroflex	Approximant
[j]	voiced	Palatal	Approximant
[w]	voiced	labial + velar	Approximant
[l]	voiced	Alveolar	lateral approximant
[h]	voiceless	Glottal	Fricative

3.2. Phonology of English

3.2.1. (Segmental) Phonology

Phonology of English (or any other language) is the functional classification of the sounds of English (or any other language). It is the systems of sounds by means of which meanings are differentiated in English (or any other language) and which serve as the building blocks for the higher linguistic levels such as Morphology and Syntax. It is the study of sound patterns (i.e. how sounds work together) in a language.

We demonstrate the knowledge of **(Segmental) Phonology** when we are asked to judge whether a string of sounds can constitute a possible English word (e.g. when inventing a brand name or playing scrabble).

The phonology of a language is also the inventory of its **phonemes**, i.e. the sum of all those sounds that show distinctive (i.e. meaning-differentiating) phonetic differences. So, a **phoneme** is the smallest meaningful unit of a language which distinguished meaning; it is the organizational unit of (segmental) Phonology.

RP as the standard (British) **English sound system**, for example, has 24 consonants, 12 vowels, and but it has many more allophones (such as clear and dark /l/, or the aspirated plosives).

By contrast, Arabic has 28 consonants and eight vowels: 3 short vowels [a, i, u], 3 long vowels [aa, ii, uu] and tow diphthongs [ay/aj, aw]. Arabic lacks the voiceless bilabial plosive /p/, while it has the aspirated version of the

consonants [p^h], as distinct phonemes.

In other words, a difference (aspiration) that does not distinguish meaning in English and is thus a **redundant** articulatory feature constitutes a **distinctive feature** in Arabic, while another one (the voicing of plosives) is distinctive in English (i.e. it distinguishes meaning), but not in Arabic.

3.2.1.1. Phones, Phonemes and Allophones

We have seen in the discussion of narrow transcription and broad transcription that the pronunciation of each sound is affected by its surrounding sounds. English speakers produce a lot of phones (speech sounds), but do all of the phones contribute to meaning? The phones that contribute to meaning differences in a language are called distinctive sounds. These distinctive sounds that contribute to meaning in words are called **phonemes**. **Phones** refers to actual sounds that we produce while phonemes as abstract mental representations of phones. **Phonemes** are written between slashes /. Examples of phonemes are /k/ and /g/ in English, German and Arabic. An allophone of **Allophones** has two basic meanings: (a) the realization of a phoneme and (b) the non-distinctive variants of a phoneme. Examples of allophones are written in square brackets []. An English example of allophones is provided by the alveolar and the velarized /l/ as in leap [li:p] and deal [di:].

3.2.1.1.1. Minimal Pairs

A minimal pair is a pair of words that differ by one sound in the same position and have different meanings, but are otherwise identical. Two sounds are different phonemes if they appear in a minimal pair.

Generally, when we wish to decide whether two segments belong to the same phoneme or, on the contrary, are realizations of two different phonemes, we put them in an identical context, that is the same string of sounds. When there is a difference between two otherwise identical strings of sound and this difference results in a change of meaning, these two strings are said to constitute a minimal pair.

If we substitute one segment for another and this results in a change in meaning the two segments belong to two different phonemes. Thus [k] and [m] are realizations of two different phonemes /k/ and /m/ because substituting one for the other as first element of the string [-zt] gives two different words: /kzt/ (cat) and /mzt/ (mat).

One can safely say that the phonemes of a given language form a system in

which they are all opposed to one another. Take English /p/ in the following examples of minimal pairs:

Table 1: /p/ as opposed to the other consonant phonemes of English

/p/ is opposed to /b/	as in	/pɪɡ/ : /bɪɡ/	pig : big
/p/ is opposed to /t/	as in	/pi:/ : /ti:/	pea : tea
/p/ is opposed to /d/	as in	/pɪɡ/ : /dɪɡ/	pig : dig
/p/ is opposed to /k/	as in	/pæt/ : /kæt/	pat : cat
/p/ is opposed to /g/	as in	/pɒt/ : /gɒt/	pot : got
/p/ is opposed to /m/	as in	/pæt/ : /mæt/	pat : mat
/p/ is opposed to /n/	as in	/pɪt/ : /nɪt/	pit : knit
/p/ is opposed to /r/	as in	/rɪp/ : /rɪm/	rip : ring
/p/ is opposed to /f/	as in	/pi:t/ : /fi:t/	peat : feet
/p/ is opposed to /v/	as in	/pet/ : /vet/	pet : vet
/p/ is opposed to /θ/	as in	/pɔ:t/ : /θɔ:t/	port : thought
/p/ is opposed to /ð/	as in	/pæt/ : /ðæt/	pat : that
/p/ is opposed to /s/	as in	/pæt/ : /sæt/	pat : sat
/p/ is opposed to /z/	as in	/pɪp/ : /zɪp/	pip : zip
/p/ is opposed to /ʃ/	as in	/pi:/ : /ʃi:/	pea : she
/p/ is opposed to /ʒ/	as in	/lepə/ : /leʒə/	leper : leisure
/p/ is opposed to /tʃ/	as in	/pi:p/ : /tʃi:p/	peep : cheap
/p/ is opposed to /dʒ/	as in	/pi:p/ : /dʒi:p/	peep : jeep
/p/ is opposed to /l/	as in	/pɪt/ : /lɪt/	pit : lit
/p/ is opposed to /r/	as in	/pɒt/ : /rɒt/	pot : rot
/p/ is opposed to /w/	as in	/pi:/ : /wi:/	pea : we
/p/ is opposed to /j/	as in	/pəʊk/ : /jəʊk/	poke : yoke
/p/ is opposed to /h/	as in	/pi:/ : /hi:/	pea : he

This procedure can theoretically be applied to each phoneme of the language.

Note, though, that in the chart above, /p/ is opposed to other consonants only. This is because even though all phonemes of a given language form a system, oppositions in that language are organized in such a way that consonants can only be opposed to consonants and vowels to vowels. We shall see in the next chapters how oppositions are organized according to the rules of syllable structure, word formation and other contingencies.

3.2.1.1.2. Distinctive Features

The phonemes of a language (like English) are not entirely separate entities;

they share common features. Any feature that distinguishes some phonemes (consonants and vowels) from others is called a **distinctive feature**.

/p/ has to be defined as a **voiceless bilabial plosive** to account for all the oppositions found with the other consonants in English. These three features are all necessary because if /p/ was described as a voiceless consonant it could be opposed to /b/, /d/, /g/, /v/, /C/, /z/, /ʒ/, /dʒ/, but would not appear as distinct from all other voiceless sounds. If /p/ was described as a bilabial only it could be opposed to all non-bilabials but would not appear as distinct from /b/ and /m/. If /p/ was described only as a plosive it would be opposed to all non-plosives but would not appear distinct from /t/, /d/, /g/, /b/, /k/.

Hence we can say that

- 1) voiceless
- 2) bilabial
- 3) plosive

are the **distinctive features** of /p/.

Consider the phoneme /m/. Phonetically it is described as a voiced bilabial nasal. However if bilabiality is necessary to account for its opposition to /n/ for example and nasality is necessary to account for its opposition to /b/ voicing is not a phonological feature since there are no voiceless nasals. As voicing is not a distinctive feature of /m/, we say it is a **redundant** feature from a phonological point of view.

Let's have a look at /l/. It is described phonetically as a voiced alveolar lateral. However since there are no other lateral sounds in English, voicing and alveolarity are **redundant phonological features**. Voicing is also a redundant feature for vowels since there are no voiceless vowels.

Each language has its own set of phonemes; oppositions among those phonemes differ necessarily from language to language: they have been based on different sets of features for each language. For example **nasality** exists both in French and in English. However in French nasality is a distinctive feature of both consonants and vowels. The French /m/ is opposed to /p/, /b/ because it is nasal, as in English. But whereas there are no nasal vowels in English (at least in Received Pronunciation (RP) of British English) in French there are nasal and oral (non-nasal) vowels: /bo/ *beau* ("beautiful") is opposed to /bõ/ *bon* ("good") because of its nasality. So is /pla/ *plat* ("flat") when it is opposed to /plã/ *plan* ("map").

Another example of the relevancy of sets of features would be the role of **lip**

rounding in French and in English. Lip rounding exists in both languages. In English, only back vowels are rounded and rounding alone will never account for the opposition between two vowels. Surrounding is a redundant feature of English vowels. In French, both /i/ and /y/ are high front vowels, but /y/ is distinct from /i/ because of its rounding only: /vy/ *vu* (“seen”) is opposed to /vi/ *vit* (“saw”). Rounding is a distinctive feature of French vowels.

Segmentation of the string of sounds can also differ from one language to the other. For example, phonetic [tʃ] is considered as one phoneme in Spanish (/tʃ/), as two in French (/t/+/ʃ/) and as one or two in English depending on the analysis of the set of consonants.

3.2.1.1.3. Allophones and Distribution of Allophones

Some sound differences do not differentiate meaning, as in the pronunciation of /l/ in the words *lip* and *pill*. While the difference may be only slight (you may try to keep track of where you place the tip of your tongue), from a phonetic point of view the two realizations of /l/ have to be considered two phones, but not two phonemes. They are called **clear** and **dark** /l/ and are two **allophones** of the phoneme /l/ in English.

In contrast to phonemes, allophones do not occur in minimal pairs, which means they either never occur in the same environment (**complementary distribution**), as in the case of clear and dark /l/, or they occur in **free variation**. For example, voiceless plosives at the end of a syllable or word are sometimes aspirated (if *deep* is pronounced [di:p^h]), but they may just as well not be (if *deep* is pronounced [di:p]). The decisive difference between phonemes and their allophones is that the variants of a phoneme do not differentiate meaning, and therefore the sound difference does not constitute a relevant phonetic feature.

3.2.1.2. Phonological Changes and Rules

Various allophones of a single phoneme are related by **phonological changes and rules**.

➤ /phonemes/ (*phonological rules*) [allophones]

The general representation of a phonological rule is (A → B / C ____ D).

A = underlying representation (phoneme; natural class of phonemes; phonological feature/s) *e.g. voiceless stops*

B = phonetic form – pronunciation (phone, specifically allophone of A; natural class of sounds; phonetic feature/s) e.g. *aspirated*

C and D = context/environment of the rule may be sounds, natural classes of sounds, phonological features; or # (=word boundary) possibilities: only C present; only D present; both C and D present

→ = “is pronounced as” or “becomes

/ = “in the context/environment...”

___ = location of target sound

Phonological rules translate some mental/underlying representation of words to the real sounds:

- (1) a. /p ɪ t/ → [p^h ɪ t]
b. /sp ɪ t/ → [sp ɪ t]

- (2) /p/ → [p^h] / #_ (# means at the beginning of the word)

Similarly for /t/ and /k/ ([p, t, k] are voiceless stops):

- (3) Voiceless stop → aspirated at the beginning of the word

- (4) [-voiced, +stop] → [+aspirated] / #_

In these rules we can refer to natural classes of sounds like:

- Voiced consonants ([b, d, g, ð, z, ʒ, n, m, . . .]),
- Rounded vowels ([u:, ʊ, o, ɔ:]),
- Nasals ([m, n, ŋ]),
- Sibilants (hissy sounds [s, z, ʃ, ʒ, tʃ, dʒ],
- etc.

The following table shows the common types of phonological rules:

Common Types of Phonological Rules	
Types of Rules	Explanation
Assimilation	A sound becomes more similar to a neighboring sound with respect to some feature.
Dissimilation	A sound becomes less similar to a neighboring sound with respect to some feature.
Insertion	inserting a segment
Deletion	deleting a segment
Metathesis	Changing the order of sounds
Strengthening	Making sounds stronger
Weakening	Making sounds weaker

Some of the common types of phonological rules are illustrated below:

1. Assimilation — a sound becomes more like a nearby sound.

Place assimilation: comfort [mf], input [mp]

Voicing assimilation talks [ks] vs. dogs [gz]

bit [ɪ] vs. bin [ɪ̃] { /ɪ/ assimilates to the following /n/ (nasal)

2. Insertion (inserting a segment/sound)

hamster /hæmstr/ ! [hæm(p)str]: [p] is sometimes inserted

3. Deletion (Deleting a segment/sound)

okay [okey] → [ʔkey] (optional)

etc

Why do we have these phonological rules? We have these phonological rules in order to: (1.) **Ease the production of speech sounds** (e.g. assimilation and deletion) make the sequence of sounds easier to articulate; and (2.) **Ease the perception of speech sounds** (e.g. insertion) make the sequence of sounds easier to be perceived.

***Note:** (See the material attached at the end of this hand out for practice of phonological rules)*

3.2.2. (Supra-segmental) Phonology

In written English we use punctuation to signal some things like emphasis, and the speed with which we want our readers to move at certain points. In spoken

English we use sounds in ways that do not apply to individual segments but to stretches of spoken discourse from words to phrases, clauses and sentences. Such effects are described in Non-segmental or **Supra-segmental Phonology**.

Among these effects are such things as **stress, intonation, tempo and rhythm** – which collectively are known as **prosodic features**. Other effects arise from altering the quality of the voice, making it breathy or husky and changing what is sometimes called the timbre – and these are paralinguistic features. Both of these kinds of effect may signal meaning. But they do not do so consistently from one language to another, and this can cause confusion to students learning a second language.

Source: Andrew Moore, 2001, <http://www.shunsley.eril.net/armoore/>

3.2.2.1. Syllables

When you think of individual sounds, you may think of them in terms of **syllables**. These are units of phonological organization and smaller than words. Alternatively, think of them as units of rhythm. Although they may contain several sounds, they combine them in ways that create the effect of unity. Thus splash is a single syllable but it combines three consonants, a vowel, and a final consonant /spl+æ+f/.

Some words have a single syllable – so they are **monosyllables** or **monosyllabic**. Others have more than one syllable and are polysyllables or **polysyllabic**. Sometimes you may see a word divided into its syllables, but this may be an artificial exercise, since in real speech the sounds are continuous. In some cases it will be impossible to tell whether a given consonant was ending one syllable or beginning another. It is possible, for example, to pronounce lamppost so that there are two /p/ sounds in succession with some interval between them. But many native English speakers will render this as /læm-pəʊst/ or /læm-pəʊsd/.

Phones combine into a **syllable (σ)**, which is essentially a vowel with optional consonants clustered around it. The vowel forms the **nucleus (N)** of a syllable, with the **onset (O)** in front of it and the **coda (C)** behind it; and **rhyme (R)** involves nucleus + coda.

There are two types of syllables in English a **closed** syllable vs. an **open** syllable entailing a syllable with coda vs. a syllable without coda. This means that, depending on whether there is a coda or not, a syllable can be described as either **closed** or **open**. The basic form of the English syllable is (CCC)V(CCCC), i.e. *I, spray, or texts* are all examples of one syllable but of

different complexity.

3.2.2.1.1. Phonotactics (Possible Syllable Structures)

Phonology does not only describe a system of sounds in isolation, but it also deals with the rules and restrictions that hold for their combinations. This branch of phonology is called **phonotactics**. In other words, **phonotactics** refers to **phonotactic constraints that** refer to the restrictions on **possible combinations of sounds** in a language; that is, they are restrictions on what phonemes can appear in a row.

The phonotactic constraints of a language are reflected on the possible syllable structures in this language. These structures vary from language to language. Notice that although English allows the sequence of consonants (i.e. **consonant clusters**) to appear before the vowel, not every combination of the consonants is possible.

The restriction on the three-consonant cluster before a vowel in English is illustrated in the following table:

English (p. 124)
V 'a'
VC 'at'
VCC 'ask'
VCCC 'asked'
CV 'no'
CVC 'not'
CVCC 'ramp'
CVCCC 'ramps'
CCV 'flew'
CCVCC 'flutes'
CCCV 'spree'

3.2.2.2. Prosodic Features (Prosody)

Prosodic Features (Prosody) belongs to the domain of supra-segmental phonology in that it describes phenomena extending over more than one phoneme. The phenomena that belong here are **stress, rhythm, and intonation**. While stress can be word or sentence stress, rhythm and intonation occur in phrases and sentences. Intonation is described by reference to pitch (tones); different levels of pitch are used to express a wide range of meanings: for

example, we use the difference between a falling and a rising pitch pattern in statements and questions.

- **Stress or loudness** – increasing volume is a simple way of giving emphasis, and this is a crude measure of stress. But it is usually combined with other things like changes in tone and tempo. We use stress to convey some kinds of meaning (semantic and pragmatic) such as urgency or anger or for such things as imperatives.

English is a strongly stressed language, in which stress is said to be phonemic, i.e. capable of distinguishing words (such as the noun **in**crease, stressed on the first syllable, and the verb **in**crease, stressed on the second syllable. Note also the difference of word stress in BrE 'se.kre.tri and AmE 'se.kre'tari.

In almost any word of more than one syllable there will be one syllable identified as taking the primary stress, and possibly another taking a secondary stress, as in civilization /ˌsɪvəlaɪ'zeɪʃn/, in which the first syllable carries secondary stress, the fourth syllable carries primary stress, and the other syllables are unstressed.

Closely related to stress in English is the process of vowel reduction; for example, in the noun contract the first syllable is stressed and contains the vowel /ɒ/ (in RP), whereas in the verb contract the first syllable is unstressed and its vowel is reduced to /ə/ (schwa).

The same process applies to certain common function words like of, which are pronounced with different vowels depending on whether or not they are stressed within the sentence. For more details, see reduced vowels in English. English also has strong prosodic stress – the placing of additional emphasis within a sentence on the words to which a speaker wishes to draw attention, and corresponding weaker pronunciation of less important words.

- **Intonation** – you may be familiar in a loose sense with the notion of tone of voice. We use varying levels of pitch in sequences (contours or tunes) to convey particular meanings. Falling and rising intonation in English may signal a difference between statement and question. Younger speakers of English may use rising (question) intonation without intending to make the utterance a question.

As concerns intonation, the pitch of the voice is used syntactically in English, for example, to convey surprise or irony, or to change a statement into a question. Most dialects of English use falling pitch for definite statements, and rising pitch to express uncertainty, as in questions (particularly yes-no

questions).

The variation and control of pitch in intonation has 3 functions: (i) grammatical = to distinguish declarative (falling) from interrogative clauses (rising); (ii) pragmatic = to manage information, emphasizing NEW vs. old information; and (iii) attitudinal = to signal emotions (surprise/enthusiasm=rise-fall, uncertainty/doubt=fall-rise, boredom/irony/sarcasm=level tone) cf. “great”
There is also a characteristic change of pitch on strongly stressed syllables, particularly on the "nuclear" (most strongly stressed) syllable in a sentence or intonation group.

- **Tempo** – we speak more or less quickly for many different reasons and purposes. Occasionally it may be that we are adapting our speech to the time we have in which to utter it (as, for example, in a horse-racing commentary). But mostly tempo reflects some kinds of meaning or attitude – so we give a truthful answer to a question, but do so rapidly to convey our distraction or irritation.
- **Rhythm** – patterns of stress, tempo and pitch together create a rhythm. Some kinds of formal and repetitive rhythm are familiar from music, rap, poetry and even chants of soccer fans. But all speech has rhythm – it is just that in spontaneous utterances we are less likely to hear regular or repeating patterns.

As regards rhythm, English is classed as a stress-timed language – one in which there is a tendency for the time intervals between stressed syllables to become equal (= same time span between stressed syllables), with corresponding faster pronunciation of groups of unstressed syllables. Contrast **syllable-timed** (= same between all syllables) as in (French and African languages). The weak forms in unstressed position are represented in auxiliaries, prepositions, conjuncts, pronouns and determiners.

All above from: (Andrew Moore, 2001, <http://www.shunsley.eril.net/armoore/>)

Writing and Sound

It is essential to distinguish between writing and sound. Because people have gone through a school system in which the orientation is towards writing it is difficult to abstract away from the written word and think in terms of sounds and not of letters. One should bear in mind that the system of writing is historically an afterthought to represent sounds in a fixed form. Writing is furthermore only a pale imitation of the sound structure of language as so many

characteristics, such as the prosodic features discussed in the previous section, cannot be represented in writing at all.

For this section on phonetics it is important to note that the orthography of a language is more or less inconsistent. It is the exception rather than the rule for a language to have a one-to-one relation between letters and sounds. In the European context, Finnish is probably the best example with languages like Dutch and Russian not far behind. Others, like English, French, Danish and Irish have many letters which in pronunciation have moved away from the sounds associated with them originally.

The relationship between the written and the spoken form of words leads to a fourfold set of distinctions – depending on the nature of the relationship – which are captured by the following labels.

Homophony Two words are pronounced the same, e.g. *father* and *farther*; *court* and *caught* (this only applies to non-rhotic varieties of English), *meat* and *meet*.

Homography Two words are written the same but not pronounced the same, e.g. *convert* (noun) and *convert* (verb); *lead* (metal) and *lead* (cord for controlling a dog's movements). Homography is not present in languages which do not have contrastive stress or the same manner of writing long and short vowels.

Homonymy Two words are written and pronounced the same, e.g. *bear* and *bear*; *bank* and *bank* in English. These words are not related etymologically. It is purely a matter of coincidence that they have developed to be written and pronounced the same.

Polysemy Two distinguishable meanings of a single word form exist. For example in English the word *neck* exists with the meaning 'part of the body' and 'narrow strip of land joining two larger parts'. In this case the second meaning is derived from the first one which is basic or primary. Seen historically, polysemous forms stem from the same root in contradistinction to homonyms which have come to be written and pronounced the same by chance.

All above of writing and sound is from: Raymond Hickey *Phonetics and Phonology* Page 21 of 22

Summary of Phonetics and Phonology of Englis

- *Phonetics* is the study of human sounds and *phonology* is the classification of the sounds within the system of a particular language or languages.
- Phonetics is divided into three types according to the production (*articulatory*), transmission (*acoustic*) and perception (*auditory*) of sounds.
- Three categories of sounds must be recognized at the outset: *phones* (human sounds), *phonemes* (units which distinguish meaning in a language), *allophones* (non-distinctive units).
- Sounds can be divided into consonants and vowels. The former can be characterized according to 1) *place*, 2) *manner of articulation* and 3) *Voice* (voiceless or voiced). For vowels one uses a coordinate system called a *vowel quadrangle* within which actual vowel values are located.
- *Phonotactics* deals with the *combinations* of sounds possible and where sounds can occur in a *syllable*.
- The basic structure for the organization of sounds is the *syllable*. It consists of an *onset* (beginning), a *rhyme* (everything after the beginning) which can be sub-divided into a *nucleus* (vowel or vowel-like centre) and a *coda* (right-edge).
- *Prosody* is concerned with features of words and sentences above the level of individual sounds, e.g. stress, pitch, intonation. Stress is frequently contrastive in English.
- The unstressed syllables of English show characteristic phonetic *reduction* and words containing this are called *weak forms*.
- It is essential to distinguish between *writing* and *sound*. There are various terms (*homophony*, *homography*, *homonymy*) to characterize the relationship between the written and the spoken form of words depending on what the *match* between the two is like.

4. Phonetics & Phonology of Arabic (Brief Introduction)

4.1. Phonetics of Arabic

4.1.1. Arabic Sounds

We have studied so far that (Standard British) English (also known as ‘Received Pronunciation’) has 24 consonant phonemes and 20 basic vowel phonemes (7 short vowels/monophthongs, 5 long vowels/monophthongs and 8 diphthongs). So, while there are only **five** main vowel **letters** – **a, e, i, o** and **u** (a legacy/inheritance from Latin) – RP speakers use four times as many **vowel sounds**. However, this situation is far from the norm, and there are many languages (in fact the majority of the world’s languages) which may be said to

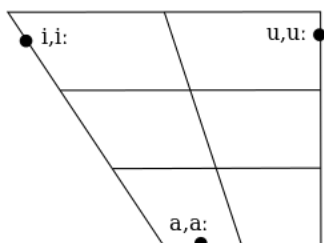
operate along the principle: **WYSIWYG** (*'what you see is what you get'*); in that their spelling systems accurately represent their *phonemic* inventories, i.e. the sounds used in them. This is the case, for instance, in all Semitic Languages like Arabic, as well as many African languages.

In Arabic phonetics there are **eight** 8 (Short and Long Vowels) Monophthongs and Diphthongs and 28 phonetically distinct consonant segments, (all are oral).

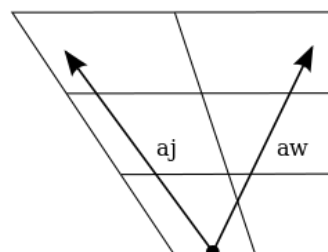
4.1.1.1. Brief Description of Arabic Vowels

In Arabic phonetics there are **eight** 8 (Short and Long Vowels) Monophthongs and Diphthongs three of them are common to both English and Arabic such as /a, i, u/. The most important aspects of vowels are height and frontness. The following is the diagram for Arabic short and long vowels as well as diphthongs.

1. **Height:** how open the inside of the mouth is. The usual scale is *high* [i, u], and *low* [a]. There may be two middle steps in the ladder, usually called *closed* [ay, oh] and *open* [eh, aw].
2. **Frontness:** how close the tongue is to the front of the mouth. Vowels can be classified into *front* /i/, *central* (/a/, or *back* /u/.



Short vowels of Arabic /a i u/
And long vowels of Arabic
/a: i: u: or aa ii uu/



Diphthongs of Arabic aj/ay and aw

Arabic has 8 (Short and Long Vowels) Monophthongs and Diphthongs (all oral). The table below shows the List of Arabic Phonetic Symbols: (Short and Long Vowels) Monophthongs and Diphthongs with examples:

(Short and Long Vowels) Monophthongs and Diphthongs				
No.	Symbol	Description	Example	Meaning
1	a	Front short low vowel	/ <i>xaaliq</i> /	Creator
2	i	Front short high vowel	/ <i>fikrah</i> /	Big/large
3	u	Back short high vowel	/ <i>muhaarib</i> /	Warrior
4	aa	Front long low vowel	/ <i>haad</i> /	Sharp
5	ii	Front long high vowel	/ <i>tariiq</i> /	Road/path
6	uu	Back long high vowel	/ <i>turuud</i> /	Parcels
7	ay	diphthong moving from mid front unrounded to high front unrounded	/ <i>xaymah</i> /	Tent
8	aw	diphthong low central unrounded to high back rounded	<i>Dawlah</i>	country

4.1.1.2. Brief Description of Arabic Consonants

Arabic consonants are formed by obstructing the flow of air from the lungs. As a first approximation, consonants vary in these dimensions:

Arabic has 28 phonetically distinct consonant segments. The table below shows the List of Arabic Phonetic Symbols: Arabic Consonants:

No.	Letter	Description	Symbol
1	أ	Voiced glottal stop	/ʔ/
2	ب	Voiced bilabial stop	/b/
3	ت	Voiceless dento-alveolar stop	/t/
4	ث	Voiceless interdental fricative	/θ/
5	ج	Voiced post-alveolar fricative	/j/*
6	ح	Devoiced pharyngeal fricative	/ħ/
7	خ	Voiceless velar fricative	/x/
8	د	Voiced dento-alveolar stop	/d/
9	ذ	Voiced interdental fricative	/ð/
10	ر	Voiced alveo-palatal trill	/r/
11	ز	Voiced alveolar fricative	/z/
12	س	Voiceless alveolar fricative	/s/
13	ش	Voiceless alveo-palatal fricative	/ʃ/
14	ص	Voiceless velarised alveolar fricative	/S/*
15	ض	Voiced velarised dento-alveolar stop	/Ḍ/
16	ط	Voiceless velarised dento-alveolar stop	/t/
17	ظ	Voiced velarised interdental fricative	/Z/*
18	ع	Voiced pharyngeal fricative	/c/
19	غ	Voiced uvular fricative	/ɣ/
20	ف	Voiceless labio-dental fricative	/f/
21	ق	Voiceless uvular stop	/q/
22	ك	Voiceless velar stop	/k/

23	ل	Voiced alveolar lateral	/l/
24	م	Voiced bilabial nasal	/m/
25	ن	Voiced alveolar nasal	/n/
26	هـ	Voiceless glottal fricative	/h/
27	و	Voiced labiovelar glide	/w/
28	ي	Voiced palatal glide	/v/*

Now, let us, as an example, have a description of the Arabic Stop/plosive Consonants: **Stop/Plosive consonants** are formed by completely stopping the flow of air at some point in the vocal tract. Air accumulates under pressure behind the stoppage, and when the stoppage is released, the air escapes with a noise called **explosion**. There are three phases: the **closure** (also known as **approach** or **closing**) phase; the articulators move to form the obstruction; the **hold** (or **compression**) phase; the blockage is maintained, resulting in a compression of the air; the **release** (or **explosion**) phase: the articulators move apart to allow the air to escape.

It is worth noting that in the voiced stops/plosives, the voicing is already there during the closure, whereas they have a longer duration than their voiceless counterparts. Arabic has six stop/plosive consonants; two voiced, and four voiceless:

1. /b/ Voiced Bilabial Plosive

- 1) Vibration of the vocal folds
- 2) Total constriction of the flow of air; the two lips are pressed and the velum is up, thus blocking access to the nasal cavity. The pressure builds up behind the blockage caused by the two lips.
- 3) The lips come apart the air escapes through the mouth in a burst.

2. /t/ Voiceless Dental Plosive

- 1) No vibration of the vocal folds
- 2) The primary constriction is caused by the tongue tip and blade moving against the upper teeth, while the rims of the tongue are in contact with the upper and lower side teeth (canines, premolars, and molars). The velum is up, thus blocking access to the nasal cavity. The pressure builds up behind the blockage caused by the tongue tip/blade and upper teeth.
- 3) The tongue drops and the air escapes through the mouth in a burst.

3. /d/ Voiced Dental Plosive

- 1) Vibration of the vocal folds
- 2) The primary constriction is caused by the tongue tip and blade moving against the upper teeth, while the rims of the tongue are in contact with the upper and lower side teeth (canines, premolars, and molars). The velum is up, thus blocking access to the nasal cavity. The pressure builds up behind the blockage caused by the tongue tip/blade and upper teeth.
- 3) The tongue drops and the air escapes through the mouth in a burst. Lips are unrounded out of context (in context: cf. adjacent vowel)

4. /k/ Voiceless Velar Plosive

- 1) No vibration of the vocal folds
- 2) Total constriction of the flow of air is formed by the back of the tongue which is expanded and raised against the soft palate/velum; the velum is up, thus blocking access to the nasal cavity. The tip of the tongue is bent towards the floor of the mouth, while the rims/edges are in contact with the back upper molars. The pressure builds up behind the blockage caused by the back of the tongue and the soft palate.
- 3) The tongue drops and the air escapes through the mouth in a burst.

5. /q/ Voiceless Uvular Plosive

- 1) No vibration of the vocal folds/cords
- 2) Total constriction of the flow of air is formed by the back of the tongue being raised against the uvula; the velum is up, thus blocking access to the nasal cavity. The pressure builds up behind the blockage caused by the back of the tongue and the uvula.
- 3) The tongue drops and the air escapes through the mouth in a burst.

6. /ʔ/ Voiceless Glottal Plosive

- 1) No vibration of the vocal folds/cords
- 2) Total constriction of the flow of air is formed by the vocal folds/cords being pressed together. The velum is up, thus blocking access to the nasal cavity. The pressure builds up behind the blockage caused by the two vocal folds.
- 3) The vocal folds are unlocked and the air escapes through the mouth in a burst.

The following table show the Tihami Yemeni Arabic (TYA) sounds with examples compared to MSA:

Tihami Yemeni Arabic (TYA) Sounds with Examples Compared to MSA			
Vowels of TYA			
SHORT /a u i e o/ LONG /aa uu ii ee oo/ There are no diphthongs in TYA, because ay and aw undergo compensatory lengthening and became /ee/ and /oo/			
Consonants of TYA			
b = voiced bilabial stop t = voiceless alveolar stop d = voiced alveolar stop T = voiceless emphatic alveolar stop D = voiced emphatic alveolar stop k = voiceless velar stop g = voiced velar stop q = voiceless uvular stop ' = voiceless glottal stop h = voiced glottal stop H = voiceless pharyngeal fricative ' = voiced pharyngeal fricative x = voiceless uvular fricative G = voiced uvular fricative		s = voiceless alveolar fricative Z = voiced alveolar fricative Š = voiceless alveopalatal fricative θ = voiced interdental fricative ʒ = voiced interdental fricative DH = emphatic interdental fricative f = voiceless labio-dental fricative S = emphatic alveolar fricative m = bilabial nasal n = alveolar nasal l = alveolar lateral r = alveolar trill w = bilabial semivowel y = alveopalatal semivowel	
Examples	English Word		MSA Word
	Book		kitaab
	Books		kutub
	Copybook		daftar
	Copybooks		daftar
	House		bayt
	Houses		biyuut
	Market		sawq
		TYA Word	
		ktaabu	
		kutubu	
		daftar	
		dafaatru	
		beetu	
		byuutu	
		Sooqu	

1. The post final vowel /u/ as pausal/u/ is a general TYA linguistic feature commonly used in (INDEFINITE MASCULINE SINGULAR NOUNS/ADJECTIVES, INDEFINITE BBROKEN PLURAL NOUNS /ADJECTIVES, INDEFINITE FEMININE SOUND PLURALS, AND VERY FEW INDEFINITE FEMININE SINGULAR NOUNS/ADJECTIVES)
2. The above transcription with examples in his table is taken from(Shaghi, Abdullah M. M. and Imtiaz Hasanain, (December 2009, pp. 122-139) and (Shaghi, Abdullah M. M. (2010)).

4.2. Phonology of Arabic

While many languages have numerous dialects that differ in phonology, the contemporary spoken Arabic language is more properly described as varieties of Arabic. This **Phonology of Arabic** deals primarily with the Phonology of Modern Standard Arabic (MSA), which is the standard variety shared by educated speakers throughout Arabic speaking regions.

MSA is used in **writing** in formal print media and **orally** in newscasts, speeches and formal declarations of numerous types.

4.2.1. Arabic Phonemes, Allophones and Phonological Distribution

Regarding the Arabic Phonemes (and allophones), here is a summary of them based on the following chart reproduced and modified by the author of this handout from Wikipedia and what has been attested from other literature on Arabic phonology:

The Phonetic Transcription of Arabic Consonant Phonemes Based on the IPA (2005)

NO.	Name of Arabic letter Transliterated	Name of Arabic letter Transcribed	Arabic Letters	IPA Transcription	Characteristics of the standardized Arabic alphabets or consonants phonemes (Three-term-label)
1	hamzah~ alif	/hamzah/~ /alif/	ء ~ ا	/ʔ/	Voiceless glottal stop
2	Baa	/baa/	ب	/b/~ /p/	Voiced bilabial stop
3	Taa	/taa/	ت	/t/	Voiceless dental stop
4	Θaa	/θaa/	ث	/θ/ ⁶	Voiceless interdental fricative
5	ziim	/ziim/	ج ~ ح	/ʒ/~	Voiced post-alveolar

	djiim jiim gjiim giim	/dʒiim/ /jiim/ /gjiim/ /giim/		/dʒ/ ~ /j/ ~ /g/ ~ /g/ ¹	fricative Voiced palatal affricate Voiced palatal stop Voiced palatalized velar stop Voiced velar stop
6	Haa	/haa/	ح	/h/ ⁴	Voiceless laryngeal fricative
7	khaa	/xaa/ /χaa/	خ	/x/ ~ /χ/ ⁵	Voiceless velar fricative Voiceless uvular fricative
8	daal	/daal /	د	/d/	Voiced alveolar stop
9	Thaal	/ðaal/	ذ	/ð/	Voiced interdental fricative
10	Raa	/raa/	ر	/r/	Voiced alveolar trill
11	Zaa	/zaa/	ز	/z/	Voiced alveolar fricative
12	Siin	/siin/	س	/s/	Voiceless alveolar fricative
13	Shin	/ʃiin/	ش	/ʃ/	Voiceless palatal fricative
14	Saad	/s ^ʕ aad/	ص	/s ^ʕ /	Voiceless alveolar emphatic stop
15	d ^ʕ aad	/d ^ʕ aad/	ض	/d ^ʕ / ³	Voiced dental emphatic stop
16	t ^ʕ aa	/t ^ʕ aa/	ط	/t ^ʕ /	Voiceless emphatic stop
17	ð ^ʕ aa z ^ʕ aa	/ð ^ʕ aa/ /z ^ʕ aa/	ظ	/ð ^ʕ / ~ /z ^ʕ /	Voiced interdental emphatic fricative Voiced dental-alveolar emphatic fricative
18	‘ayn	/ʕayn /	ع	/ʕ/	Voiced pharyngeal stop
19	ghayn	/ɣayn/ /ʁayn/	غ	/ɣ/ ~ /ʁ/ ⁵	Voiced velar stop Voiced uvular stop
20	Faa	/faa/	فـ	/f/ ~ /v/	Voiceless labio-dental fricative Modified /v/
21	qaaf	/qaaf/	ق	/q/	Voiced uvular stop
22	kaaf	/kaaf/	ك	/k/	Voiced velar stop
23	laam	/laam/	ل	l ²	Voiced alveolar lateral

24	/miim/	/miim/	م	/m/	Voiced bilabial nasal stop
25	/nuun/	/nuun/	ن	/n/	Voiced alveolar nasal stop
26	/haa/	/haa/	ه	/h/	Voiceless pharyngeal fricative
27	/waaw/	/waaw/	و	/w/	Voiced bilabial glide
28	/jaa/ /yaa/	/jaa/ /yaa/	ي	/j/ ~ /y/	Voiced palatal glide

1. This phoneme is represented by the Arabic letter *jīm* (ج) and has many standard pronunciations. [dʒ] is representative of north Algeria, Iraq, also in most of the Arabian peninsula but with an allophonic [ʒ] in some positions; [ʒ] occurs in most of the Levant and most North Africa; and [g] is used in most of Egypt and some regions in Yemen (as in the **Tihami Yemeni Arabic (TYA)** e.g., gamalu “a camel”) and Oman.
2. /l/ is pronounced [ɫ] in /ʔalla:h/, the name of God, q.e. Allah, when the word follows *a*, *ā*, *u* or *ū* (after *i* or *ī* it is unvelarized: *bismi l–lāh* /bismilla:h/). Some speakers velarize other occurrences of /l/ in MSA, in imitation of their spoken dialects.
3. The emphatic consonant /dˤ/ was actually pronounced [ɟˤ], or possibly [d͡ɟˤ] either way, a highly unusual sound. The medieval Arabs actually termed their language *luḡhat al-ḍād* 'the language of the Ḍād' (the name of the letter used for this sound), since they thought the sound was unique to their language. (In fact, it also exists in a few other minority Semitic languages, e.g., Mehri.)
4. In many varieties, /ħ, ʕ/ (ح, ع) are actually epiglottal [ħ, ʕ] (despite what is reported in many earlier works).
5. /x/ and /χ/ (خ, غ) are often post-velar, though velar and uvular pronunciations are also possible.
6. /θ/ (ث) can be pronounced as [t] or even [s]. In some places of Maghreb it can be also pronounced as [tʰs].
7. Arabic emphatics represented by /tˤ, dˤ, sˤ, ɖˤ/ (ط, ض, ظ, ظ) exhibit simultaneous **pharyngealization** [tˤ, dˤ, sˤ, ɖˤ] as well as varying degrees of **velarization** [tˣ, dˣ, sˣ, ɖˣ], so they may be written with the "**Velarized or pharyngealized**" diacritic (~) as: /ṭ, ḍ, ṣ, ɖ̣/. This simultaneous articulation is described as "**Retracted Tongue Root**" by phonologists.

8. In some transcription systems, emphasis is shown by capitalizing the letter, for example, /d^s/ is written /D/; in others the letter is underlined or has a dot below it, for example, /ḏ/.

These 28 consonant phonemes of Arabic make phonemic contrasts between "**emphatic**"(pharyngealized or velarized) consonants and **non-emphatic** ones; also, the 8 three vowel phonemes of Arabic make phonemic contrasts.

Both vowels and consonants can be phonologically short or long. Long (geminate) consonants are normally written doubled in Latin transcription (i.e. bb, dd, etc.), reflecting the presence of the Arabic diacritic mark *shaddah*, which indicates doubled consonants.

In actual pronunciation, doubled consonants are held twice as long as short consonants. This consonant lengthening is phonemically contrastive: *qabala* 'he accepted' vs. *qabbala* 'he kissed'. A "**phonemic quality of length**" applies to consonants as well as vowels.

As regard to the **Allophones**, they are partially conditioned by neighboring consonants within the same word. As a general rule, for example, /a/ and /a:/ or /aa/ are:

- (i.) retracted to [ɑ] in the environment of a neighboring /r/, /q/ or an emphatic (pharyngealized) consonant: /s^s/, /d^s/, /t^s/, /ð^s/ /ʔ/ and in a few regional standard pronunciations also /x/ and /ɣ/;
- (ii.) advanced to [æ] in the environment of most consonants:
 - (a.) labial consonants (/m/, /b/ and /f/),
 - (b.) plain (non-pharyngealized) coronal consonants with the exception of /r/ (/θ/, /ð/, /n/, /t/, /d/, /s/, /z/, /l/, /ʃ/ and /d͡ʒ~g~ʒ/)
 - (c.) pharyngeal consonants (/ħ/ and /ʕ/)
 - (d.) glottal consonants (/h/ and /ʔ/)
 - (e.) /j or y/, /k/ and /w/.

As regard to the **phonological distribution**, the most frequent consonant phoneme is /r/, the rarest is /ð^s/ . The frequency distribution of the 28 consonant phonemes, based on the 2,967 tri-literal / tri-consonantal roots listed by Wehr is (with the percentage of roots in which each phoneme occurs) illustrated in the following table:

Phoneme	Frequency	Phoneme	Frequency
/r/	24%	/w/	18%
/l/	17%	/m/	17%

/n/	17%	/b/	16%
/f/	14%	/ʃ/	13%
/q/	13%	/d/	13%
/s/	13%	/h/	12%
/j/	12%	/ʒ/	11%
/dʒ/	10%	/k/	9%
/h/	8%	/z/	8%
/tʰ/	8%	/x/	8%
/sʰ/	7%	/ʔ/	7%
/t/	6%	/dʰ/	5%
/y/	5%	/θ/	3%
/ð/	3%	/ðʰ/	1%

This distribution does not necessarily reflect the actual frequency of occurrence of the phonemes in speech, since pronouns, prepositions and suffixes are not taken into account, and the roots themselves will occur with varying frequency.

In particular, /t/ occurs in several extremely common affixes (occurring in the marker for second-person or feminine third-person as a prefix, the marker for first-person or feminine third-person as a suffix, and as the second element of Forms VIII and X as an infix) despite being fifth from last on Wehr's list. The list does give, however, an idea of which phonemes are more marginal than others. Note that the five least frequent letters are among the six letters added to those inherited from the Phoenician alphabet, namely, *ḍād*, *tāʾ*, *hāʾ*, *zāʾ*, *ḍāl* and *ḡayn*.

4.2.2. Syllable Structure of Arabic

Arabic has two kinds of syllables: open syllables (CV) and (CVV)—and closed syllables (CVC), (CVVC), and (CVCC). The syllable types with three morae (units of time), i.e. CVC and CVV, are termed *heavy syllables*, while those with four morae, i.e. CVVC and CVCC, are *superheavy syllables*. Super-heavy syllables in Classical Arabic occur in only two places: at the end of the sentence (due to pausal pronunciation), and in words such as *ḥārr* 'hot', *māddah* 'stuff, substance', *taḥājjū* 'they disputed with each other', where a long *ā* occurs before two identical consonants (a former short vowel between the consonants has been lost). (In less formal pronunciations of Modern Standard Arabic, superheavy syllables are common at the end of words or before clitic suffixes such as *-nā* 'us, our', due to the deletion of final short vowels.)

In surface pronunciation, every vowel must be preceded by a consonant (which may include the glottal stop [ʔ]). There are no cases of hiatus within a word (where two vowels occur next to each other, without an intervening consonant).

Some words do have an underlying vowel at the beginning, such as the definite article *al-* or words such as *ishtarā* 'he bought', *ijtimā* 'meeting'. When actually pronounced, one of three things happens:

- 1) If the word occurs after another word ending in a consonant, there is a smooth transition from final consonant to initial vowel, e.g., *al-ijtimā* 'meeting' /alidʒtimaːʕ/.
- 2) If the word occurs after another word ending in a vowel, the initial vowel of the word is elided, e.g., *baytu (a)l-mudīr* 'house of the director' /bajtulmudiːr/.
- 3) If the word occurs at the beginning of an utterance, a glottal stop [ʔ] is added onto the beginning, e.g., *al-baytuhuwa ...* 'The house is ...' /ʔalbajtuhuwa .../.

4.2.3. Stress in Arabic

Word stress is not phonemically contrastive in Standard Arabic. It bears a strong relationship to vowel length. The basic rules for Modern Standard Arabic are:

- 1) A final vowel, long or short, may not be stressed.
- 2) Only one of the last three syllables may be stressed.
- 3) Given this restriction, the last heavy syllable (containing a long vowel or ending in a consonant) is stressed, if it is not the final syllable.
- 4) If the final syllable is super heavy and closed (of the form CVVC or CVCC) it receives stress.
- 5) If no syllable is heavy or super heavy, the first possible syllable (i.e. third from end) is stressed.
- 6) As a special exception, in Form VII and VIII verb forms stress may not be on the first syllable, despite the above rules: Hence *inkatab(a)* 'he subscribed' (whether or not the final short vowel is pronounced), *yankatib(u)* 'he subscribes' (whether or not the final short vowel is pronounced), *yankatib* 'he should subscribe (juss.)'. Likewise Form VIII *ishtarā* 'he bought', *yashtarī* 'he buys'.

Examples: *kitāb(un)* 'book', *kā-ti-b(un)* 'writer', *mak-ta-b(un)* 'desk', *ma-kā-ti-b(u)* 'desks', *mak-ta-ba-tun* 'library' (but *mak-ta-ba(-tun)* 'library' in short pronunciation), *ka-ta-bū* (Modern Standard Arabic) 'they wrote' = *ka-ta-bu* (dialect), *ka-ta-bū-h(u)* (Modern Standard Arabic) 'they wrote it' = *ka-ta-bū* (dialect), *ka-ta-ba-tā* (Modern Standard Arabic) 'they (dual, fem) wrote', *ka-tab-tu* (Modern Standard Arabic) 'I wrote' = *ka-tabt* (short form or dialect). Doubled consonants count as two consonants: *ma-jal-la-(tan)* 'magazine', *ma-ḥall(-un)* 'place'.

These rules may result in differently stressed syllables when final case endings are pronounced, vs. the normal situation where they are not pronounced, as in the above example of *mak-ta-ba-tun* 'library' in full pronunciation, but *mak-ta-ba(-tun)* 'library' in short pronunciation.

The restriction on final long vowels does not apply to the spoken dialects, where original final long vowels have been shortened and secondary final long vowels have arisen from loss of original final *-hu/hi*.

All above from: (http://en.wikipedia.org/wiki/Arabic_phonology/2014)

5. Transcription

5.1. Narrow vs. Broad Transcription

Transcription is a method of writing down the pronunciation of a speech sound, word or utterance in a systematic and consistent way. For example, [θɪŋk] is a phonetic transcription for the (orthographic) word 'think'.

Phonetic transcription may aim to transcribe the phonology of a language, or it may wish to go further and specify the exact phonetic realization. We may therefore, in all systems of transcription, distinguish between **broad transcription** and **narrow transcription**.

Broad transcription indicates only the more noticeable phonetic features of an utterance, whereas narrow transcription encodes more information about the phonetic variations of the specific allophones in the utterance. The difference between broad and narrow is a continuum. One particular form of a broad transcription is a **phonemic transcription**, which disregards all allophonic difference, and, as the name implies, is not really a **phonetic transcription** at all, but a representation of phonemic structure.

For example, one particular pronunciation of the English word *little* may be transcribed using the IPA as /'lɪtəl/ or ['lɪɾ̥]; the broad, phonemic transcription, placed between slashes //, indicates merely that the word ends with phoneme /l/, but the narrow, allophonic transcription, placed between square brackets [], indicates that this final /l/ is dark (velarized) ([ɾ̥]).

(Source: http://en.wikipedia.org/wiki/Phonetic_transcription accessed on 14/10/2013)

American phonetic transcription

<i>Symbol</i>	<i>Description</i>	<i>English equivalent</i>
[š]	palato-alveolar voiceless fricative	[ʃ]
[ž]	palato-alveolar voiced fricative	[ʒ]
[č]	palato-alveolar voiceless affricate	[tʃ]
[tš]	alternative rendering	
[j]	palato-alveolar voiced affricate	[dʒ]
[dž]	alternative rendering	

American phonetic transcription

		<i>American</i>	<i>British</i>
1)	palatal approximant yes	[y] [yes]	[j] [jes]
2)	front end-element of rising diphthong try	[y] [tray]	[i] [traɪ]
3)	back end-element of rising diphthong bow	[w] [baw]	[u] [bau]
4)	high front rounded vowel Fr. vu	[ū] [vū]	[y] [vy]
5)	high front rounded vowel Fr. peu	[ō] [pō]	[ø] [pø]

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